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Self-Assessment

Adjust your competence estimate to the right to focus on the questions

ADVANCED BEGINNER

TREATMENT GOALS FOR ISCHEMIC STROKE

Adult Suspected Stroke Algorithm

Below you can see key steps in the **Adult Suspected Stroke Algorithm**. This reviews the critical in-hospital time periods for patient assessment and treatment:

1 **Immediate general and neurologic assessment** by the hospital or stroke team, emergency physician, or another expert, ideally upon arrival and within 10 minutes after arrival:

- Activate stroke team upon EMS notification, prepare for emergent CT scan or MRI of brain upon arrival. Stroke team meets EMS on arrival.
- Assess ABCs and give oxygen if needed. Obtain IV access and perform laboratory assessments; check glucose and treat if indicated.
- Review patient history, medications, and procedures. Establish time of symptom onset or last known normal.

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Self-Assessment

Adjust your competence estimate to the right to focus on the questions

ADVANCED BEGINNER

TREATMENT GOALS FOR ISCHEMIC STROKE

- Review patient history, medications, and procedures. Establish time of symptom onset or last known normal.
- Perform physical exam and neurologic examination, including NIH Stroke Scale or Canadian Neurological Scale.

2 **Neurologic assessment** by the stroke team or designee and noncontrast computed tomography (**NCCT**) scan or **MRI** performed **within 20 minutes** after hospital arrival (ideally EMS goes directly to computed tomography CT/MRI suite from the field)

3 **Interpretation** of the NCCT/MRI within 45 minutes after ED/brain imaging suite arrival

4 Initiation of **fibrinolytic therapy** in appropriate patients (those without contraindications) **within 45 minutes** after hospital arrival

5 **Door-to-device times within 90 minutes** for direct arriving patients and **60 minutes** for transfer patients

6 **Door-in to door-out times** for patients being transferred for possible **EVT within 60 minutes**

1 2 3 NEXT

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TREATMENT GOALS FOR ISCHEMIC STROKE

6 **Door-in to door-out times** for patients being transferred for possible **EVT within 60 minutes**

7 **Door-to-admission** (stroke unit or neurocritical care unit) time of **3 hours**

1 2 3 NEXT

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TREATMENT GOALS FOR ISCHEMIC STROKE

Critical Time Periods

Patients with acute ischemic stroke have a time-dependent benefit for reperfusion therapy similar to that of patients with ST-segment elevation myocardial infarction, but this time-dependent benefit is much shorter. **The critical time period for administration of reperfusion therapies begin with the onset of symptoms.**

Critical time periods from hospital arrival are summarized here and represent maximum times:

- Immediate general assessment: **within 10 minutes**
- Immediate neurologic assessment: **within 20 minutes**
- Acquisition of CT/MRI of the head: **within 20 minutes**

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TREATMENT GOALS FOR ISCHEMIC STROKE

- Immediate neurologic assessment: **within 20 minutes**
- Acquisition of CT/MRI of the head: **within 20 minutes**
- Interpretation of the CT/MRI scan: **within 45 minutes**
- Administration of fibrinolytic therapy, timed from ED/brain imaging suite arrival: **within 60 minutes**
- Administration of fibrinolytic therapy, timed from onset of symptoms: **within 3 hours, or 4.5 hours in selected patients**
- Administration of endovascular therapy, timed from onset of symptoms: **up to 24 hours for patients with LVO: 0 to 6 hours requires eligible NCCT scan; 6 to 24 hours requires eligible penumbral imaging**
- Admission to a monitored bed: **within 3 hours**
- Interfacility transfers for EVT (door-in-door-out): **within 1 hour**

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TREATMENT GOALS FOR ISCHEMIC STROKE

Decision Point: Hemorrhage or No Hemmorhage

Additional imaging techniques such as CT perfusion, CT angiography, or MRI scans of patients with suspected stroke should be promptly interpreted by a physician skilled in neuroimaging interpretation. **Obtaining these additional studies should not delay initiation of IV alteplase in eligible patients**. The presence of **hemorrhage vs no hemorrhage** determines the next steps in treatment.

Hemorrhage is present

If hemorrhage is noted on the NCCT/MRI scan, the patient is **not a candidate for fibrinolytics**. Initiate **intracranial hemorrhage**

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TREATMENT GOALS FOR ISCHEMIC STROKE

protocol. Admit to the **stroke unit** or **neurologic ICU**, or transfer to a higher level of care.

PREVIOUS 1 2 3

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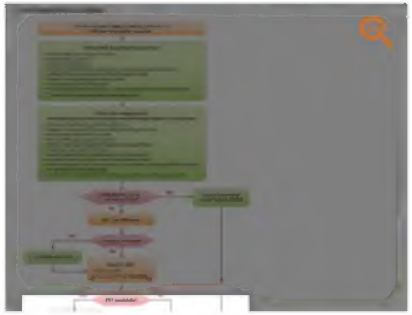
TREATMENT GOALS FOR ISCHEMIC STROKE

Hemorrhage is not present

If the NCCT/MRI scan shows no evidence of hemorrhage and **no sign of other abnormality** (eg, tumor or recent stroke), the patient may be a candidate for **fibrinolytic therapy**.



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Treatment Goals for Isc...

What is the time goal for **neurologic assessment** by the stroke team or designee and **noncontrast computed tomography** or **magnetic resonance imaging** performed **after hospital arrival**?

You got it!

Your Answer | **20 minutes**

I Know It

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Learn more here:

Treatment Goals for Isc...

What is the **time goal** for **initiation of fibrinolytic therapy** in appropriate patients without contraindications **after hospital arrival**?

You got it!

Your Answer | **45 minutes**

I Know It

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Coach

What is the door-to-needle time goal for 85% or more of acute ischemic stroke patients treated with IV thrombolytics?

You got it!

Your Answer | 60 minutes

Learn more here:

Treatment Goals for Isc...

I Know It

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What is the door-to-device time goal for direct-arriving patients with acute ischemic stroke treated with endovascular therapy?

You got it!

Your Answer | 90 minutes

Learn more here:

Treatment Goals for Isc...

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ELIGIBILITY FOR ALTEPLASE THERAPY

Fibrinolytic Therapy

The AHA/ASA 2019 Guidelines for the Early Management of Patients With Acute Ischemic Stroke **recommends giving IV alteplase to patients with acute ischemic stroke** who meet the **current eligibility criteria** if it is given by:

- **Physicians** using a clearly defined institutional protocol
- **A knowledgeable interdisciplinary team** familiar with stroke care
- An institution with a **commitment to quality stroke care**

Studies have demonstrated that there is a **higher likelihood of good to excellent functional outcome when alteplase is given to**

1 2 NEXT

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ELIGIBILITY FOR ALTEPLASE THERAPY

alteplase to patients with acute ischemic stroke who meet the **current eligibility criteria** if it is given by:

- **Physicians** using a clearly defined institutional protocol
- **A knowledgeable interdisciplinary team** familiar with stroke care
- An institution with a **commitment to quality stroke care**

Studies have demonstrated that there is a **higher likelihood of good to excellent functional outcome when alteplase is given to adults** with acute ischemic stroke **within 3 hours after onset of symptoms**, or within **4.5 hours after onset of symptoms for selected patients**. Evidence from prospective randomized studies in adults also documents a greater likelihood of benefit the earlier treatment begins.

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ELIGIBILITY FOR ALTEPLASE THERAPY

Evaluation for Fibrinolytic Therapy

If the CT/MRI scan is negative for hemorrhage, the patient may be a candidate for fibrinolytic therapy.

Immediately perform further eligibility and risk stratification:

- If the CT/MRI scan shows no hemorrhage, the probability of acute ischemic stroke remains. **Review inclusion and exclusion criteria for IV fibrinolytic therapy** and **repeat the neurologic exam** (NIHSS or Canadian Neurological Scale).
- If the patient's neurologic function is rapidly improving to normal, fibrinolytics may be unnecessary.

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ELIGIBILITY FOR ALTEPLASE THERAPY

- If the CT/MRI scan shows no hemorrhage, the probability of acute ischemic stroke remains. **Review inclusion and exclusion criteria for IV fibrinolytic therapy** and **repeat the neurologic exam** (NIHSS or Canadian Neurological Scale).
- If the patient's neurologic function is rapidly improving to normal, fibrinolytics may be unnecessary.

You can see **inclusion and exclusion criteria** by clicking on the button below.

Inclusion and Exclusion Criteria

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CHALLENGE US

Inclusion and Exclusion Characteristics of Patients With Ischemic Stroke Who Could Be Treated With Alteplase Within 3 Hours After Symptom Onset and Extended Window for Select Patient From 3 to 4.5 Hours*

Indications (COR I)	
Within 3 hours†	IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 minutes with initial 10% of dose given as bolus over 1 minute) is recommended for selected patients who may be treated within 3 hours of ischemic stroke symptom onset or patient last known well or at baseline state. Physicians should review the criteria outlined in this table to determine patient eligibility.‡ (COR I; LOE A)
Within 3 hours—Age	For otherwise medically eligible patients ≥18 years of age, IV alteplase administration within 3 hours is equally recommended for patients ≤80 and >80 years of age.‡ (COR I; LOE A)
Within 3 hours—Severe stroke	For severe stroke, IV alteplase is indicated within 3 hours from symptom onset of ischemic stroke. Despite increased risk of hemorrhagic transformation, there is still proven clinical benefit for patients with severe stroke symptoms.‡ (COR I; LOE A)
Within 3 hours—Mild disabling stroke	For otherwise eligible patients with mild but disabling stroke symptoms, IV alteplase is recommended for patients who can be treated within 3 hours of ischemic stroke symptom onset or patient last known well or at baseline state (COR I; LOE B-R)§
BP	IV alteplase is recommended in patients with BP <185/110 mm Hg and in those patients whose BP can be lowered safely to this level with antihypertensive agents, with the physician assessing the stability of the BP before starting IV alteplase.‡ (COR

BP	IV alteplase is recommended in patients with BP <185/110 mm Hg and in those patients whose BP can be lowered safely to this level with antihypertensive agents, with the physician assessing the stability of the BP before starting IV alteplase.‡ (COR I; LOE B-NR)II
CT	IV alteplase administration is recommended in the setting of early ischemic changes on NCCT of mild to moderate extent (other than frank hypodensity).‡ (COR I; LOE A)
Additional recommendations for treatment with IV alteplase for patients with AIS (COR IIa)	**And (COR IIb)**
Wake-up and unknown time of onset	IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 minutes with initial 10% of dose given as bolus over 1 minute) administered within 4.5 hours of stroke symptom recognition can be beneficial in patients with AIS who awake with stroke symptoms or have unclear time of onset >4.5 hours from last known well or at baseline state and who have a DW-MRI lesion smaller than one third of the MCA territory and no visible signal change on FLAIR. (COR IIa; LOE B-R)§
Early improvement	IV alteplase treatment is reasonable for patients who present with moderate to severe ischemic stroke and demonstrate early improvement but remain moderately impaired and potentially disabled in the judgment of the examiner.‡ (COR IIa; LOE A)
Stroke mimics	The risk of symptomatic intracranial hemorrhage in the stroke mimic population is quite low; thus, starting IV alteplase is probably recommended in preference over delaying treatment to pursue additional diagnostic studies.‡ (COR IIa; LOE B-NR)II
Contraindications (COR III: No Benefit)*	**And (COR III: Harm)**
0 - to 4.5-hour window—Mild nondisabling stroke	For otherwise eligible patients with mild nondisabling stroke (NIHSS score 0–5), IV

Stroke mimics	The risk of symptomatic intracranial hemorrhage in the stroke mimic population is quite low; thus, starting IV alteplase is probably recommended in preference over delaying treatment to pursue additional diagnostic studies.‡ (COR IIa; LOE B-NR)II
Contraindications (COR III: No Benefit)*	**And (COR III: Harm)**
0 - to 4.5-hour window—Mild nondisabling stroke	For otherwise eligible patients with mild nondisabling stroke (NIHSS score 0–5), IV alteplase is not recommended for patients who could be treated within 3 and 4.5 hours of ischemic stroke symptom onset or patient last known well or at baseline state. (COR III: No Benefit, LOE B-R)§
CT	There remains insufficient evidence to identify a threshold of hypoattenuation severity or extent that affects treatment response to alteplase. However, administering IV alteplase to patients whose CT brain imaging exhibits extensive regions of clear hypoattenuation is not recommended. These patients have a poor prognosis despite IV alteplase, and severe hypoattenuation defined as obvious hypodensity represents irreversible injury.‡ (COR III: No Benefit; LOE A)¶
ICH	IV alteplase should not be administered to a patient whose CT reveals an acute intracranial hemorrhage.‡ (COR III: Harm; LOE C-EO)II¶
Ischemic stroke within 3 months	Use of IV alteplase in patients presenting with AIS who have had a prior ischemic stroke within 3 months may be harmful.‡ (COR III: Harm; LOE B-NR)II¶
Severe head trauma within 3 months	In AIS patients with recent severe head trauma (within 3 months), IV alteplase is contraindicated.‡ (COR III: Harm; LOE C-EO)II¶
Acute head trauma	Given the possibility of bleeding complications from the underlying severe head trauma, IV alteplase should not be administered in posttraumatic infarction that occurs

Acute head trauma	Given the possibility of bleeding complications from the underlying severe head trauma, IV alteplase should not be administered in posttraumatic infarction that occurs during the acute in-hospital phase.‡ (COR III: Harm; LOE C-EO)II¶ (Recommendation wording modified to match COR III stratifications.)
Intracranial/intraspinal surgery within 3 months	For patients with AIS and a history of intracranial/spinal surgery within the prior 3 months, IV alteplase is potentially harmful.‡ (COR III: Harm; LOE C-EO)II¶
History of intracranial hemorrhage	IV alteplase administration in patients who have a history of intracranial hemorrhage is potentially harmful.‡ (COR III: Harm; LOE C-EO)II¶
Subarachnoid hemorrhage	IV alteplase is contraindicated in patients presenting with symptoms and signs most consistent with an SAH.‡ (COR III: Harm; LOE C-EO)II¶
GI malignancy or GI bleed within 21 days	Patients with a structural GI malignancy or recent bleeding event within 21 days of their stroke event should be considered high risk, and IV alteplase administration is potentially harmful.‡ (COR III: Harm; LOE C-EO)II¶
Coagulopathy	The safety and efficacy of IV alteplase for acute stroke patients with platelets <100 000/mm^3, INR >1.7, aPTT >40 seconds, or PT >15 seconds are unknown, and IV alteplase should not be administered.‡ (COR III: Harm; LOE C-EO)II¶ (In patients without history of thrombocytopenia, treatment with IV alteplase can be initiated before availability of platelet count but should be discontinued if platelet count is <100 000/mm^3. In patients without recent use of OACs or heparin, treatment with IV alteplase can be initiated before availability of coagulation test results but should be discontinued if INR is >1.7 or PT is abnormally elevated by local laboratory standards.) (Recommendation wording modified to match COR III stratifications.)
LMWH	IV alteplase should not be administered to patients who have received a full treatment

	should be discontinued if INR is >1.7 or PT is abnormally elevated by local laboratory standards.) (Recommendation wording modified to match COR III stratifications.)
LMWH	IV alteplase should not be administered to patients who have received a full treatment dose of LMWH within the previous 24 h.‡ (COR III: Harm; LOE B-NR)§|| (Recommendation wording modified to match COR III stratifications.)
Thrombin inhibitors or factor Xa inhibitors	The use of IV alteplase in patients taking direct thrombin inhibitors or direct factor Xa inhibitors has not been firmly established but may be harmful.‡ (COR III: Harm; LOE C-EO)||¶ IV alteplase should not be administered to patients taking direct thrombin inhibitors or direct factor Xa inhibitors unless laboratory tests such as aPTT, INR, platelet count, ecarin clotting time, thrombin time, or appropriate direct factor Xa activity assays are normal or the patient has not received a dose of these agents for >48 hours (assuming normal renal metabolizing function). (Alteplase could be considered when appropriate laboratory tests such as aPTT, INR, ecarin clotting time, thrombin time, or direct factor Xa activity assays are normal or when the patient has not taken a dose of these ACs for >48 hours and renal function is normal.) (Recommendation wording modified to match COR III stratifications.)
Concomitant Abciximab	Abciximab should not be administered concurrently with IV alteplase. (COR III: Harm; LOE B-R)§

Alteplase Considerations in the 3- to 4.5-Hour Time Window in Addition to Those in the 0- to 3-Hour Window

Indications (COR 1)	
3-4.5 hours‡	IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 min with initial 10% of dose

Alteplase Considerations in the 3- to 4.5-Hour Time Window in Addition to Those in the 0- to 3-Hour Window

Indications (COR 1)	
3-4.5 hours†	IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 min with initial 10% of dose given as bolus over 1 min) is also recommended for selected patients who can be treated within 3 and 4.5 hours of ischemic stroke symptom onset or patient last known well. Physicians should review the criteria outlined in this table to determine patient eligibility.‡ (COR 1; LOE B-R)II
3-4.5 hours–Age	IV alteplase treatment in the 3- to 4.5-hour time window is recommended for those patients ≤80 years of age, without a history of both diabetes mellitus and prior stroke, NIHSS score ≤25, not taking any OACs, and without imaging evidence of ischemic injury involving more than one third of the MCA territory.‡ (COR 1; LOE B-R)II
Additional recommendations for treatment with IV alteplase for patients with AIS (COR 2a)	**And (COR 2b)**
3-4.5 hours–Age	For patients >80 years of age presenting in the 3- to 4.5-hour window, IV alteplase is safe and can be as effective as in younger patients.‡ (COR 2a; LOE B-NR)II
3-4.5 hours—Diabetes mellitus and prior stroke	In AIS patients with prior stroke and diabetes mellitus presenting in the 3- to 4.5- hour window, IV alteplase may be as effective as treatment in the 0- to 3-hour window and may be a reasonable option.‡ (COR 2b; LOE B-NR)II
3-4.5 hours—Severe stroke	The benefit of IV alteplase between 3 and 4.5 hours from symptom onset for patients with very severe stroke symptoms (NIHSS score >25) is uncertain.‡ (COR 2b; LOE C-

	NIHSS score ≤25, not taking any OACs, and without imaging evidence of ischemic injury involving more than one third of the MCA territory.‡ (COR 1; LOE B-R)‖
Additional recommendations for treatment with IV alteplase for patients with AIS (COR 2a)	**And (COR 2b)**
3-4.5 hours–Age	For patients >80 years of age presenting in the 3- to 4.5-hour window, IV alteplase is safe and can be as effective as in younger patients.‡ (COR 2a; LOE B-NR)‖
3-4.5 hours—Diabetes mellitus and prior stroke	In AIS patients with prior stroke and diabetes mellitus presenting in the 3- to 4.5- hour window, IV alteplase may be as effective as treatment in the 0- to 3-hour window and may be a reasonable option.‡ (COR 2b; LOE B-NR)‖
3-4.5 hours—Severe stroke	The benefit of IV alteplase between 3 and 4.5 hours from symptom onset for patients with very severe stroke symptoms (NIHSS score >25) is uncertain.‡ (COR 2b; LOE C-LD)‖
3 -4.5 hours—Mild disabling stroke	For otherwise eligible patients with mild disabling stroke, IV alteplase may be reasonable for patients who can be treated within 3 and 4.5 hours of ischemic stroke symptom onset or patient last known well or at baseline state. (COR 2b; LOE B-NR)§

Abbreviations: AC, anticoagulants; AIS, acute ischemic stroke; aPTT, activated partial thromboplastin time; BP, blood pressure; COR, Class of Recommendation; CT, computed tomography; DW-MRI, diffusion-weighted magnetic resonance imaging; FLAIR, fluid-attenuated inversion recovery; GI, gastrointestinal; ICH, intracerebral hemorrhage; INR, international normalized ratio; IV, intravenous; LMWH, low-molecular-weight heparin; LOE, Level of Evidence; MCA, middle cerebral artery; NCCT, noncontrast computed tomography; NIHSS, National Institutes of Health Stroke Scale; OAC, oral anticoagulant; PT, prothromboplastin time.

*The relative contraindications are abbreviated. Modified from Table 8 in the "Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the

Abbreviations: AC, anticoagulants; AIS, acute ischemic stroke; aPTT, activated partial thromboplastin time; BP, blood pressure; COR, Class of Recommendation; CT, computed tomography; DW-MRI, diffusion-weighted magnetic resonance imaging; FLAIR, fluid-attenuated inversion recovery; GI, gastrointestinal; ICH, intracerebral hemorrhage; INR, international normalized ratio; IV, intravenous; LMWH, low-molecular-weight heparin; LOE, Level of Evidence; MCA, middle cerebral artery; NCCT, noncontrast computed tomography; NIHSS, National Institutes of Health Stroke Scale; OAC, oral anticoagulant; PT, prothromboplastin time.

*The relative contraindications are abbreviated. Modified from Table 8 in the "Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: a Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association." Please see Table 8 for a full listing of specific considerations.

†When uncertain, the time of onset time should be considered the time when the patient was last known to be normal or at baseline neurological condition.

‡Recommendation unchanged or reworded for clarity from 2015 IV Alteplase. See Table XCV in online Data Supplement 1 for original wording.

§See also the text of these guidelines for additional information on these recommendations.

‖ LOE amended to conform with American College of Cardiology/AHA 2015 Recommendation Classification System.

¶COR amended to conform with American College of Cardiology/AHA 2015 Recommendation Classification System.

Unless otherwise specified, these eligibility recommendations apply to patients who can be treated within 0 to 4.5 hours of ischemic stroke symptom onset or patient last known well or at baseline state.

Clinicians should also be informed of the indications and contraindications from local regulatory agencies (for current information from the US Food and Drug Administration refer to http://www.accessdata.fda.gov/drugsatfda_docs/label/2015/103172s5203lbl.pdf).

For a detailed discussion of this topic and evidence supporting these recommendations, refer to the AHA scientific statement on the rationale for inclusion and exclusion criteria for IV alteplase in AIS.

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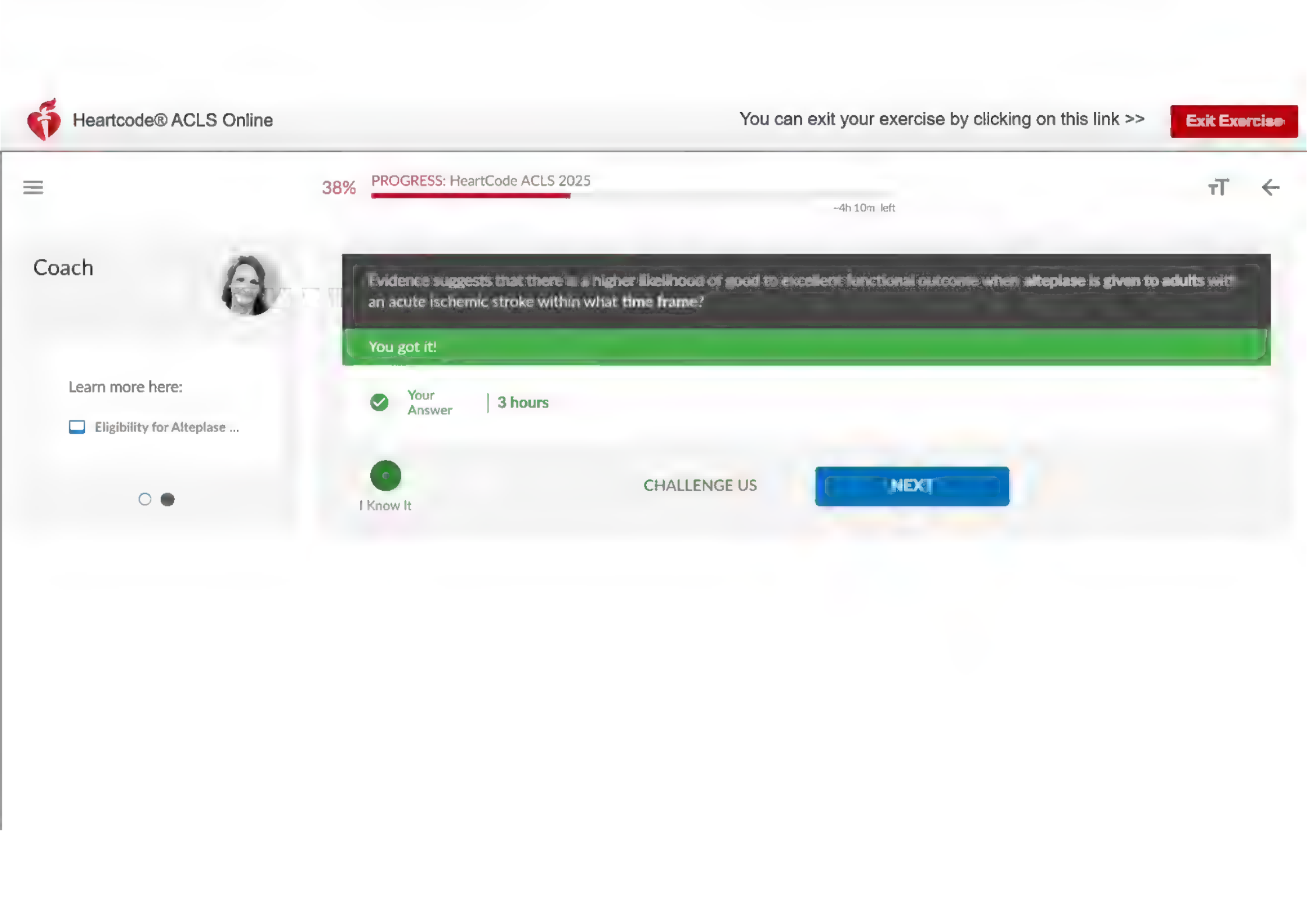
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Coach
Evidence suggests that there is a higher likelihood of good to excellent functional outcome when alteplase is given to adults with an acute ischemic stroke within what time frame?
You got it!
Learn more here:
Eligibility for Alteplase ...
Your Answer
3 hours
I Know It
CHALLENGE US
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ELIGIBILITY CRITERIA FOR ENDOVASCULAR THERAPY

Although IV alteplase remains as a first-line treatment, the **AHA now recommends endovascular therapy for select patients with acute ischemic stroke due to an LVO**.

As with fibrinolytic therapy, **patients must meet inclusion criteria** to be considered for this treatment. Similarly, better clinical outcomes are associated with reduced times from symptom onset to reperfusion, but these new treatment options **offer the added benefit of expanding the treatment window up to 24 hours from the onset of symptoms**.

Mechanical Thrombectomy With Stent Retrievers

Patients arriving within 6 hours after symptom onset should receive endovascular therapy with a stent retriever if they meet **all of the following criteria:**

I KNEW | GOT IT NOW | THINK I GOT IT | I DON'T GET IT

CHALLENGE US

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ELIGIBILITY CRITERIA FOR ENDOVASCULAR THERAPY

Mechanical Thrombectomy With Stent Retrievers

Patients arriving within 6 hours after symptom onset should receive endovascular therapy with a stent retriever if they meet **all of the following criteria:**

- Prestroke modified Rankin Score of 0 to 1
- Causative LVO of the internal carotid artery or proximal middle cerebral artery demonstrated on cerebrovascular imaging
- Age 18 years or older
- NIHSS score of 6 or greater
- Alberta Stroke Program Early CT Score (ASPECTS) of 6 or greater. (ASPECTS is an early, reliable tool that uses a 10-point quantitative topographic CT scan score to determine early ischemic changes)
- Treatment can be initiated (groin puncture) within 6 hours after symptom onset or last known normal

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Coach

What is the **maximum time** from **last known normal** when **endovascular therapy** can be performed?

You got it!

Your Answer | 24 hours

Learn more here:

Eligibility Criteria for En...

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Coach

What is the maximum time from last known normal when intra-arterial thrombolysis for select patients can be used for treatment?

You got it!

Your Answer | 6 hours

Learn more here:

Eligibility Criteria for En...

I Know It

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GENERAL STROKE CARE

Actions

After being considered for reperfusion strategies, **all patients should be placed on an acute stroke pathway**.

The **general care of all patients with stroke** includes the following actions.

- Begin acute stroke pathway
- Assess ABCs, and give oxygen if needed
- Monitor blood glucose
- Monitor blood pressure
- Monitor temperature

Coach

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GENERAL STROKE CARE

The **general care of all patients with stroke** includes the following actions:

- Begin acute stroke pathway
- Assess ABCs, and give oxygen if needed
- Monitor blood glucose
- Monitor blood pressure
- Monitor temperature
- Perform dysphagia screening
- Monitor for complications of stroke and fibrinolytic therapy
- Transfer to a higher level of care (EVT, neurologic intensive care unit) if indicated

Coach

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GENERAL STROKE CARE

Begin Stroke Pathway

Admit patients to a stroke unit (if available) for careful observation, including **monitoring of blood pressure and neurologic status**. If neurologic status worsens, order an emergent CT scan. Determine if cerebral edema or hemorrhage is the cause; consult neurosurgery as appropriate.

Additional stroke care includes support of the airway, oxygenation, ventilation, and nutrition. Provide normal saline to maintain intravascular volume (eg, approximately 75 to 100 mL/h) if needed.

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GENERAL STROKE CARE

Monitor Blood Glucose

Hyperglycemia is associated with worse clinical outcome in patients with acute ischemic stroke. But there is **no direct evidence that active glucose control improves clinical outcome.**

There is evidence that insulin treatment of hyperglycemia in other critically ill patients improves survival rates. For this reason, **consider giving IV or subcutaneous insulin to lower blood glucose** in patients with acute ischemic stroke when the **serum glucose level is greater than 180 mg/dL.**

Monitor for Complications of Stroke and Fibrinolytic Therapy

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GENERAL STROKE CARE

There is evidence that insulin treatment of hyperglycemia in other critically ill patients improves survival rates. For this reason, **consider giving IV or subcutaneous insulin to lower blood glucose** in patients with acute ischemic stroke when the **serum glucose level is greater than 180 mg/dL**.

Monitor for Complications of Stroke and Fibrinolytic Therapy

Prophylaxis for seizures is not recommended. But **treatment of acute seizures** followed by **administration of anticonvulsants to prevent further seizures** is recommended.

Monitor the patient for **signs of increased intracranial pressure**. Continue to control blood pressure to reduce the potential risk of bleeding.

Coach

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GENERAL STROKE CARE

Hypertension Management in Alteplase Candidates

Although management of hypertension in the stroke patient is controversial, patients who are candidates for fibrinolytic therapy should have their blood pressure controlled to lower the risk of intracerebral hemorrhage after administration of alteplase.

If a patient is eligible for fibrinolytic therapy, **blood pressure must be 185 mm Hg or less systolic** and **110 mm Hg or less diastolic** to limit the risk of bleeding complications.

Because the maximum interval from the onset of stroke until effective treatment of stroke with alteplase is limited, most patients

Coach

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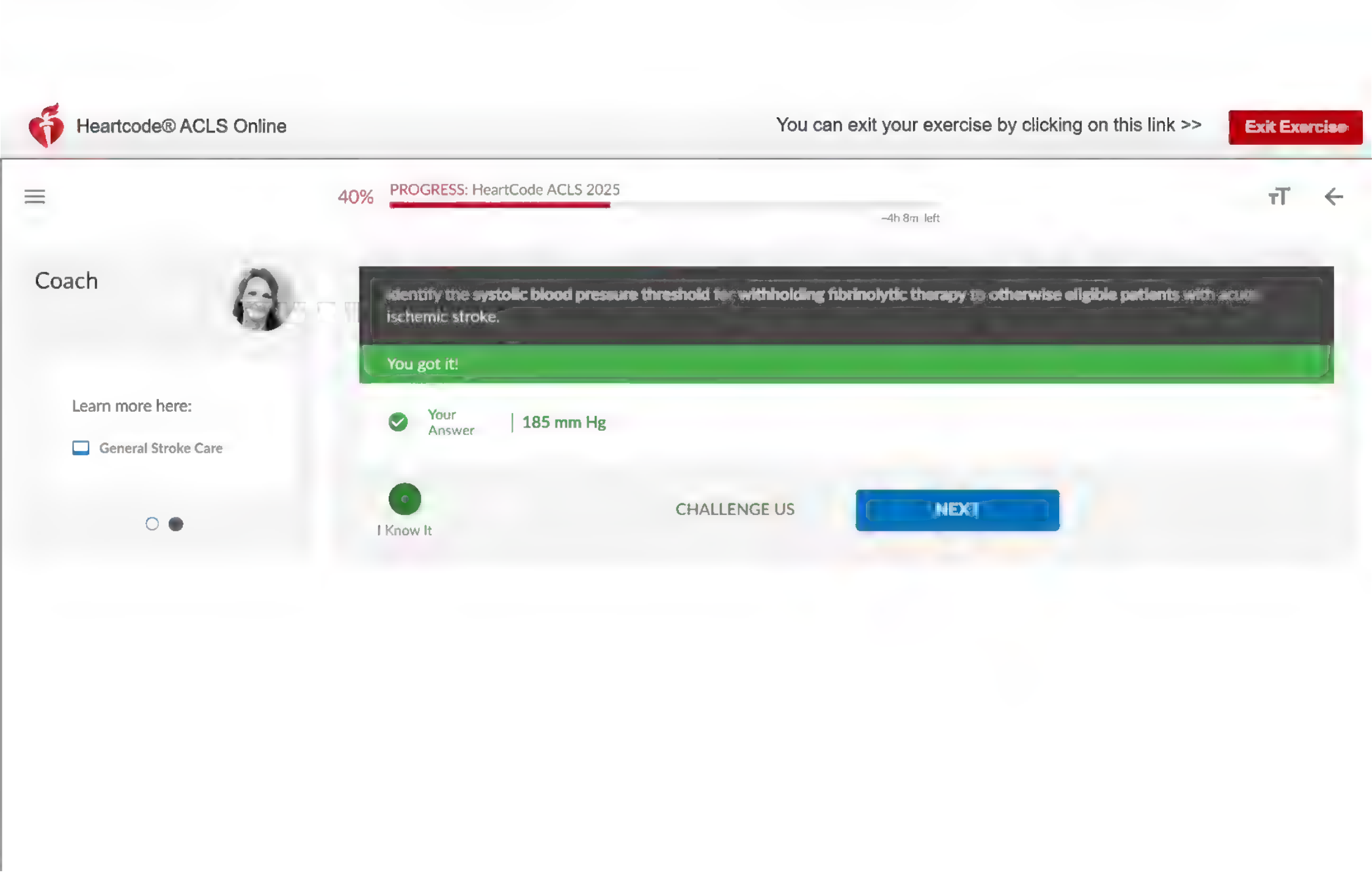
Autoplay On

GENERAL STROKE CARE

Because the maximum interval from the onset of stroke until effective treatment of stroke with alteplase is limited, most patients with sustained hypertension above these levels will not be eligible for IV alteplase.

Managing arterial hypertension in patients not undergoing reperfusion strategies remains challenging. Data to guide recommendations for treatment are inconclusive or conflicting. **Many patients have spontaneous declines in blood pressure during the first 24 hours after onset of stroke.**

By clicking on the button below, you will be able to review potential approaches to arterial hypertension in acute ischemic stroke patients who are candidates for acute reperfusion therapy.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40%
PROGRESS: HeartCode ACLS 2025
~4h 8m left
Coach
ischemic stroke.
You got it!
Learn more here:
General Stroke Care
Your Answer
185 mm Hg
I Know It
CHALLENGE US
NEXT

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~4h 9m left

Coach

What is the diastolic blood pressure threshold for withholding fibrinolytic therapy in otherwise eligible patients with acute ischemic stroke?

You got it!

Your Answer | 110 mm Hg

Learn more here:

General Stroke Care

I Know It

CHALLENGE US

NEXT

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~4h 7m left

Coach

Which action is not part of the acute stroke pathway?

You got it!

Your Answer | Seizure prophylaxis

Learn more here:

General Stroke Care

I Know It

CHALLENGE US

NEXT

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Exit Exercise

Press | F11 | to exit full screen

41% PROGRESS· HeartCo 2025

~4h 8m left

Coach

What blood glucose level should trigger the administration of IV or subcutaneous insulin for a patient with acute ischemic stroke?

You got it!

Your Answer | 180 mg/dL

Learn more here:

General Stroke Care

I Know It

CHALLENGE US

NEXT

Coach

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Autoplay On

Introduction

A 74-year-old man experienced left-arm weakness and left-sided facial paralysis when he woke up this morning. He has a past medical history of poorly controlled hypertension.

CHALLENGE US

NEXT

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41% PROGRESS: HeartCode ACLS 2025

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Coach

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Autoplay On

The HR is 92/min, RR is 14/min, BP is 130/86 mm Hg, SpO_2 is 97%, and atrial fibrillation is on the monitor.

What additional assessment and stabilization activities should be completed?

SELECT ALL THAT APPLY

- [ ] Perform validated prehospital stroke screen and stroke severity tool

I KNOW IT | THINK I KNOW IT | [illegible] | NO IDEA

Coach

Push ▶ for reading content aloud.

Autoplay On

What needs to be completed for this patient within 20 minutes after hospital arrival?

CHOOSE THE CORRECT ANSWER

Administration of fibrinolytic therapy

Interpretation of the emergent CT scan or MRI of the brain

Admission to a monitored bed

Neurologic assessment

I KNOW IT

I DON'T KNOW IT

NO IDEA

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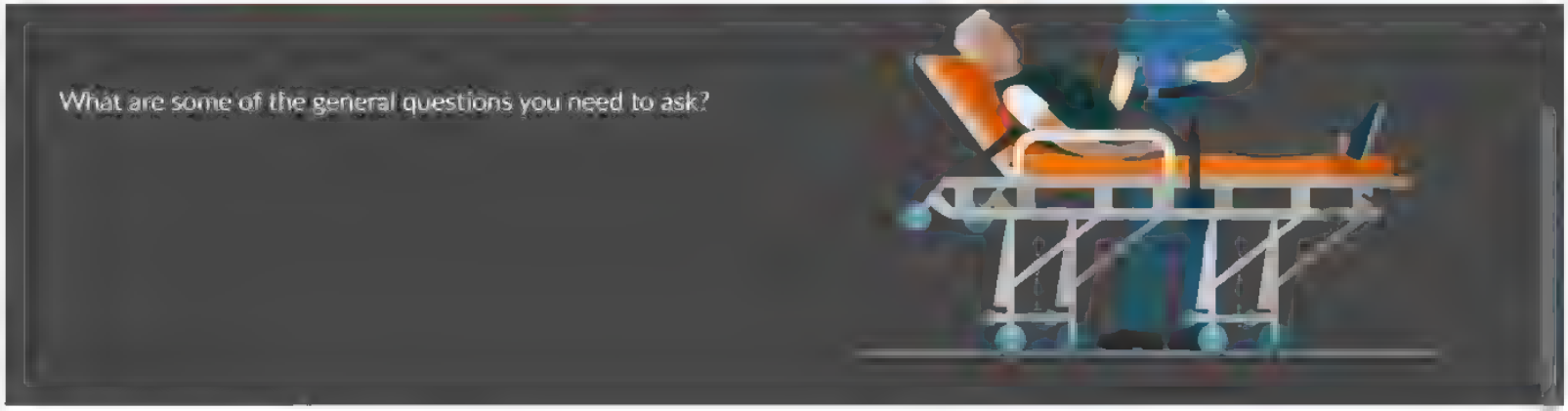

SELECT ALL THAT APPLY

- [ ] When did the symptoms start?
- [ ] Do you have any allergies?

I KNOW IT

NO IDEA

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Coach

Push ▶ for reading content aloud.

Autoplay On

SELECT ALL THAT APPLY

- [ ] When did the symptoms start?
- [ ] Do you have any allergies?
- [ ] Do you take any medications?
- [ ] Has your wife been sick as well?
- [ ] Did you eat anything today?
- [ ] What other symptoms do you have?

I KNOW IT

NO IDEA

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Coach

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Autoplay On

SELECT ALL THAT APPLY

- [x] When did the symptoms start?
- [x] Do you have any allergies?
- [x] Do you take any medications?
- [ ] Has your wife been sick as well?
- [ ] Did you eat anything today?
- [x] What other symptoms do you have?

I KNOW IT

NO IDEA

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Coach

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Within 45 minutes, the neuroimaging interpretation of the CT scan of the brain suggests an acute ischemic infarction. There are no signs of hemorrhage or mass lesions.

Is this patient a potential candidate for fibrinolytic therapy?

CHOOSE THE CORRECT ANSWER

Not enough information

Yes

No

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

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~4h 8m left

Coach

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Autoplay On

What actions should the hospital staff take to determine whether the patient is a candidate for fibrinolytic therapy?

CHOOSE THE CORRECT ANSWER

Repeat the neurologic exam

Determine family stroke history

I KNOW IT

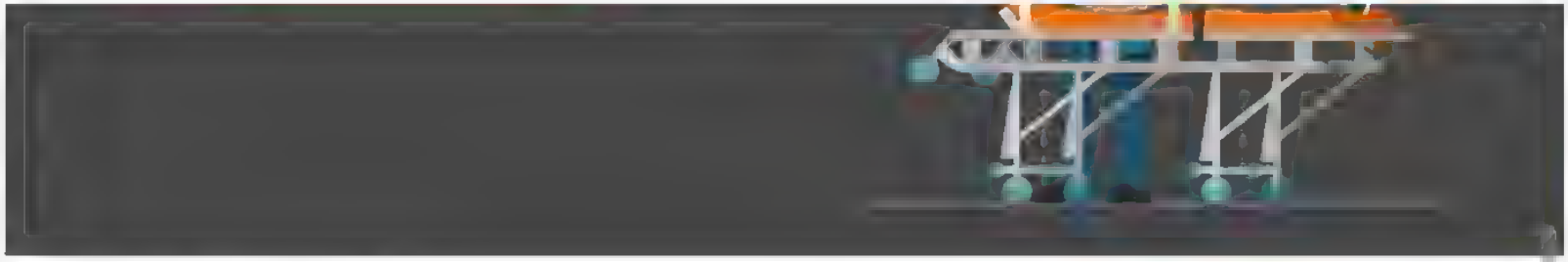
I THINK I KNOW IT

NO IDEA

Coach

Push ▶ for reading content aloud.

Autoplay On



CHOOSE THE CORRECT ANSWER

Repeat the neurologic exam

Determine family stroke history

Obtain an MRI of the brain for confirmation of hemorrhage

Order a 12-lead ECG

I KNOW IT

NO IDEA

Coach

Push ▶ for reading content aloud.

Autoplay On

Because this patient is no longer a candidate for fibrinolytic therapy, what are your next steps for him?

SELECT ALL THAT APPLY

- [ ] Order an emergent x-ray
- [ ] Order an emergent CT scan
- [ ] Support airway, breathing, and circulation (ABCs)

I KNOW IT

NO IDEA

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Coach

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Autoplay On

Because this patient is no longer a candidate for fibrinolytic therapy, what are your next steps for him?

SELECT ALL THAT APPLY

- [ ] Order an emergent x-ray
- [x] Order an emergent CT scan

I KNOW IT | I DON'T KNOW IT | NOT SURE | NO IDEA

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Coach

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Autoplay On

SELECT ALL THAT APPLY

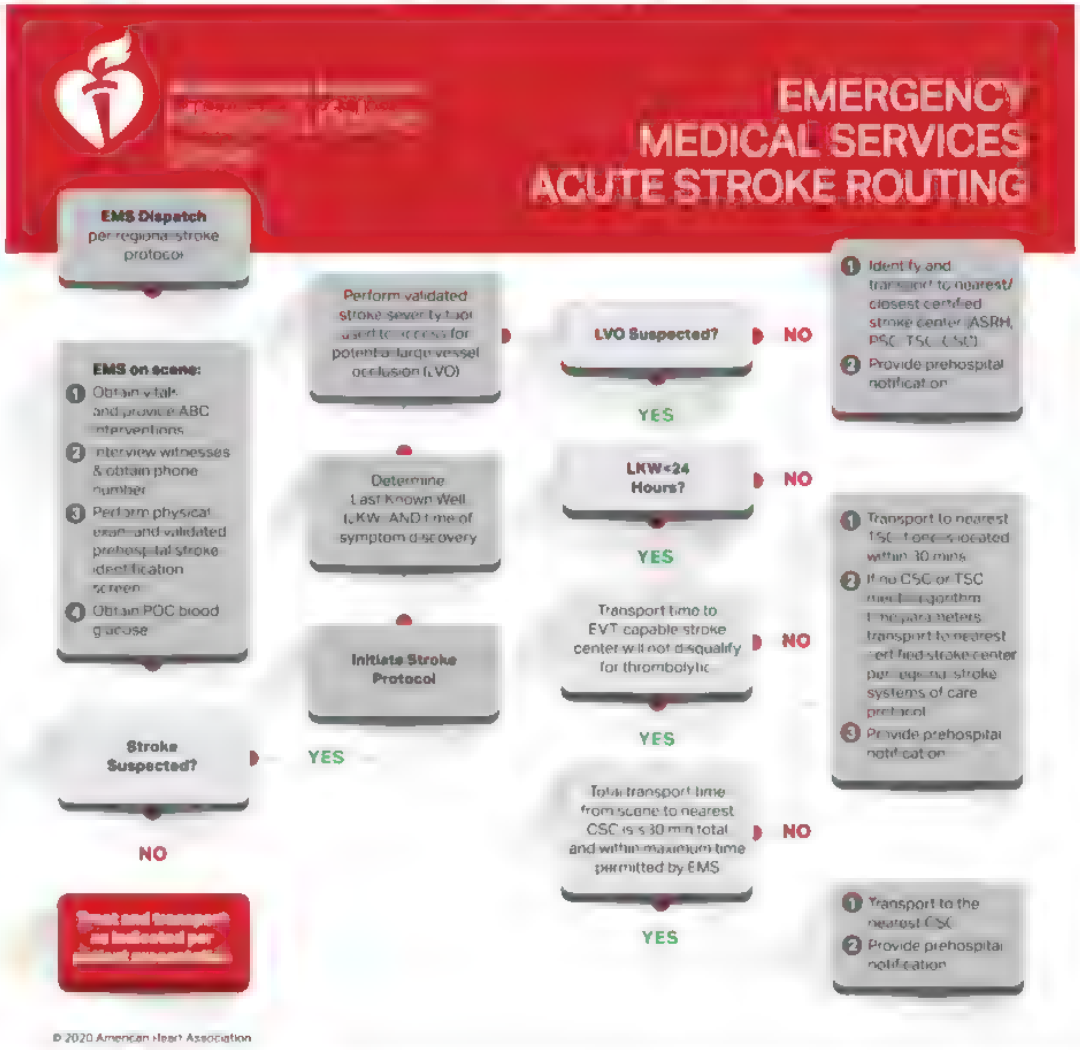
- [ ] Order an emergent x-ray
- [x] Order an emergent CT scan
- [x] Support airway, breathing, and circulation (ABCs)
- [ ] Begin the stroke pathway
- [ ] Administer O_2
- [x] Consider giving adenosine
- [x] Admit the patient to an intensive care unit

I KNOW IT

NO IDEA

Coach

Push aloud.



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Coach

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Autoplay On

The HR is 92/min, RR is 14/min, BP is 130/86 mm Hg, SpO_2 is 97%, and atrial fibrillation is on the monitor.

What additional assessment and stabilization activities should be completed?

You got it!

Perform validated prehospital stroke screen and stroke severity tool

Algorithm

Your Answer

Think So

CHALLENGE US

NEXT

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~4h 8m left

Coach

Push ▶ for reading content aloud.

Autoplay On

Perform validated prehospital stroke screen and stroke severity tool

Your Answer

Algorithm

Algorithm

Learn more

Your Answer — Provide prehospital notification to the receiving hospital

Your Answer — Initiate stroke protocol

Your Answer — Establish time of symptom onset (last known normal)

Your Answer — Check glucose

Think So

CHALLENGE US

NEXT

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~4h 8m left

Coach

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Autoplay On

What needs to be completed for this patient within 20 minutes after hospital arrival?

You got it!

Your Answer

Neurologic assessment

Algorithm

Learn more

I Know It

CHALLENGE US

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Coach

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Your Answer | When did the symptoms start?
Learn more

Your Answer | Do you have any allergies?

Your Answer | Do you take any medications?

Your Answer | What other symptoms do you have?

I Know It

CHALLENGE US

NEXT

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Coach

Push ▶ for reading content aloud.

Autoplay On

[redacted]

You got it

Your Answer | Yes

Learn more

I Know It

CHALLENGE US

NEXT

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~4h 8m left

Coach

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Autoplay On

"What actions should the hospital staff take to determine whether the patient is a candidate for fibrinolytic therapy"

You got it!

Your Answer

Repeat the neurologic exam

Learn more

I Know It

CHALLENGE US

NEXT

Coach

Push ▶ for reading content aloud.

Autoplay On

You find that the patient's neurologic function is rapidly improving.

Is this patient still a candidate for fibrinolytic therapy?

CHOOSE THE CORRECT ANSWER

Not enough information

Yes

No

I KNOW IT

I DON'T KNOW IT

NO IDEA

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~4h 8m left

Coach

Push ▶ for reading content aloud.

Autoplay On

You find that the patient's neurologic function is rapidly improving.

Is this patient still a candidate for fibrinolytic therapy

You got it!

Your Answer

No

Learn more

I Know It

CHALLENGE US

NEXT

Coach

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Autoplay On

SELECT ALL THAT APPLY

- [x] Support airway, breathing, and circulation (ABCs)
- [ ] Consider giving adenosine
- [ ] Administer O_2
- [x] Order an emergent CT scan
- [ ] Order an emergent x-ray
- [ ] Begin the stroke pathway
- [x] Admit the patient to an intensive care unit

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA

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Coach

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Autoplay On

Not there yet...

Your Answer

Support airway, breathing, and circulation (ABCs)

Algorithm

Algorithm

Learn more

Your Answer

Admit the patient to an intensive care unit

Missed Answer

Begin the stroke pathway

Your Answer

Order an emergent CT scan

If the patient is not a candidate for fibrinolytics, support ABCs; begin the stroke pathway; and admit the patient to a stroke unit or an intensive care unit.

Think So

CHALLENGE US

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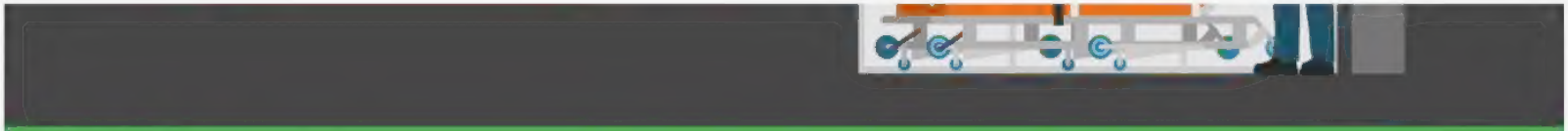

You got it!

Your Answer | Begin the stroke pathway

Your Answer | Support airway, breathing, and circulation (ABCs)

Algorithm

Algorithm

Learn more

Your Answer | Admit the patient to an intensive care unit

I Know It

CHALLENGE US

NEXT

Coach

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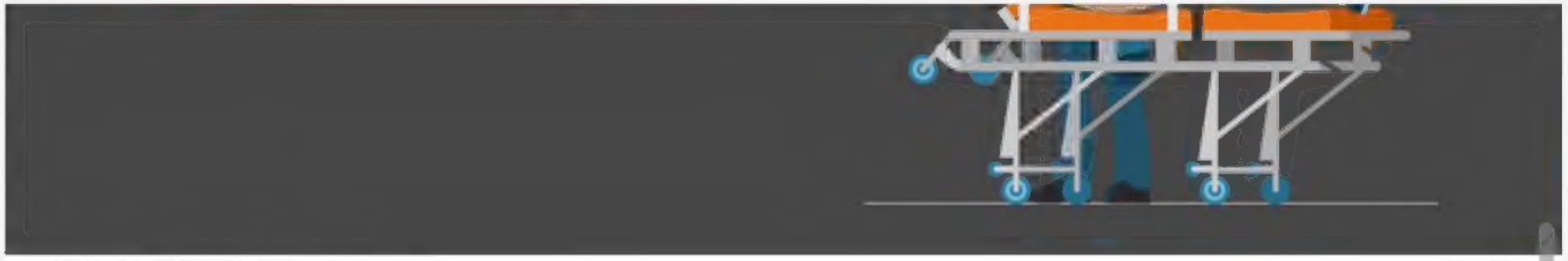
Autoplay On



CHOOSE THE CORRECT ANSWER

Obtain an MRI of the brain for confirmation of hemorrhage

Determine family stroke history

✓ Repeat the neurologic exam

Order a 12-lead ECG

I KNOW IT | THINK I KNOW IT | NOT SURE | NO IDEA